OCE-M82- 016

82 JUN 04

MEMORANDUM FOR: Chief, Communications Security Division, OC
Chief, Domestic Network Division, OC
Chief, Foreign Network Division, OC

INFO: Chief, Human Resources Management Division, OC

25X1

FROM: [redacted]
Chief, Engineering Division, OC

SUBJECT: Offline Cryptosystem Project Plan - Phase I (U)

1. The attached project plan describes Phase I of a two phase project to provide an offline cryptosystem for replacing the HW-28. (U)

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2. Please indicate concurrence by signing and returning page 1 of the attached plan. Comments and questions are welcomed. If you have any further questions, please contact [redacted] on [redacted] (C) A9c5.2

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[redacted]

Attachment:
As stated, h/w

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DOCUMENT UNCLASSIFIED UPON REMOVAL OF ATTACHMENT

[redacted]

WARNING NOTICE - INTELLIGENCE SOURCES AND METHODS INVOLVED

PROJECT PLAN

PROJECT NAME: OFFLINE CRYPTOSYSTEM REPLACEMENT PROJECT
PHASE 1 - REQUIREMENTS ANALYSIS

APPROVED:

C/ED_____

C/ED/CSB_____

CONCUR:

OC-CSD_____

OC-FND_____

OC-DND_____

1. SCOPE AND SUMMARY - The Office of Communications is presently evaluating the [redacted] communications terminal as a possible replacement for the aging M-28 terminal equipment currently in use throughout the network. This subproject will incorporate an off-line cryptosystem into the [redacted] terminal system, thereby eliminating the need for the HW-28 equipment now in use as primary and backup off-line crypto. This paper will examine the operational, technical, and security requirements and discuss several possible approaches to the problem.

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2. PURPOSE - The original project that addressed off-line systems was Project [redacted] analyzed all currently available off-line systems and selected the RACE (Rapid Automatic Cryptographic Equipment) as the system that best fit the needs of a primary off-line communications center. The RACE system was later adopted by OC as a standard replacement for the HW-28 off-line terminals in primary off-line stations.

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The purpose of this project is to incorporate the RACE off-line system into the M-28 replacement terminal to be used as either a primary or back-up cryptosystem. All operational functions being met by the HW-28 will be met by this system. In addition, any possible enhancements and automation will be developed and incorporated into the overall system. The project has been broken into two phases: first, a requirements analysis phase in which the [redacted] RACE, and base station system capabilities and requirements will be identified. This information analysis phase will develope an optimum design approach to the system which will be summarized in the Phase 2 project plan. The second phase of the project will be the actual design and testing of a prototype system.

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3. REASON - The current off-line cryptosystem is the HW-28, a slow, labor-intensive unit that is no longer supportable in the long term. It will be replaced by the microprocessor-based RACE system, the cryptographic portion of which has already been certified as high-grade cryptology by NSA. The RACE has been approved by OC as a replacement system for use in primary off-line stations. Incorporation of the RACE cryptographic subsystem into the new terminal equipment at stations that are primarily on-line will provide compatibility with the primary off-line stations, thereby simplifying the base station automation requirements [redacted] In addition, if the RACE crypto algorithm can be coded as part of the [redacted] then fewer 'stand-alone' RACE units will need to be purchased, resulting in considerable cost savings. A stand alone RACE unit will cost $12K in production quantities. This includes the keyboard, 12 character display, and the associated support software (text editing, I/O handling), all of which are present [redacted]

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An objective of this project is to investigate whether a single board processor could be designed to use [redacted] existing I/O capability at a cost of less than $4K (in production quantities),

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resulting in a cost savings of about 66%.

4. PROGRAM OVERVIEW - This project will be conducted as a major subproject of the M-28 Terminal Replacement Project. The project will be coordinated with [redacted] personnel since both projects are under development concurrently and deal with offline cryptographic operations.

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5. OPERATIONAL REQUIREMENTS

A. The final system must be TEMPEST (NACSEM 5100) approved and high grade cryptology, (approved for processing all classification levels through Top Secret Codeword).

B. The system shall be easy to operate, possibly by a non-OC communicator, since it may be used infrequently at stations where it is purely a back-up system.

C. The system shall interconnect with and/or form an integral part of the [redacted] permitting editing and storage of messages.

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D. Keying and key management should be as simple as possible.

E. Clearing garbles (i.e. due to loss of crypto-synchronization) should be either automatic or possible by bit- or character-slipping.

6. SECURITY REQUIREMENTS - The system shall be TEMPEST approved and capable of handling all levels of classifications. Ideally, the system should be capable of operation (i.e. meet TEMPEST standards) in or [redacted] and require no storage controls (other than those normally required for [redacted] when in a power-off state. Key storage will be in volatile RAM. Because the RACE algorithm [redacted] has already been approved by NSA, NO modification will be made to the existing cryptographic software as it is used in the RACE. The implementation of the input and output routines, as well as key management routines that are currently used in the RACE will be closely coordinated with OC-CSD and NSA. The final prototype system will be documented and submitted to NSA for certification.

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7. RESOURCE REQUIREMENTS - Precise requirements are difficult to estimate at this stage of the planning cycle, but the following is intended to give an approximation of the level of effort and funding that will be required for Phase 1 of this project. Phase 2 requirements will be addressed in the Phase 2 project plan.

PHASE ONE HUMAN RESOURCES REQUIREMENTS:

Apprx. 60 man-days engineering analysis and review of RACE hardware and software documentation to determine operational and technical parameters such as:

1. Memory size requirements
2. Implementation of [redacted] the RACE algorithm) 25X1
3. I/O interfacing
4. Operation of automatic key selection
5. Power requirements

Apprx. 10 man-days OC-CSD engineering to assist in analysis of RACE operation, technical requirements, and liaison with NSA.

Apprx. 5 man-days engineering to summarize analysis results and prepare final project proposal document.

Apprx. 4 man-days management supervision, review, budget preparations and revisions.

Apprx. 3 man-days each OC-FND, CSD, DND, and HRD review of project proposal.

PHASE ONE COSTS:

2 ea. RACE units for evaluation.....$25 K.

Prototype development (parts, etc)..$ 8 K.

8. DEVELOPMENT PLAN - In the initial planning stages of this project, several questions will require answers prior to formulation of an approach to the system design. The characteristics and limitations of 25X1 the [redacted] erminal will have to be identified, along with an analysis of the RACE software. This requires the documentation of the RACE software which is to be delivered within the next few weeks from NSA. 25X1 The [redacted] software is presently being analyzed by OC-ED/CSB.

The RACE parameters such as memory size, general organization and 25X1 utilization of the [redacted] will impact the possible integration of the algorithm into the [redacted] 25X1

After these questions are answered, then one of several options may be elected:

A. If the RACE algorithm will run on the Z-80 in the available 25X1 memory space of the [redacted] it should be possible to extend the unused memory slots in the [redacted] to include the RACE algorithm. 25X1 This would involve adding additional memory to the [redacted] 25X1

B. If, because of security, memory, or power constraints, the RACE algorithm will not fit into the [redacted] then an external 'black box' may be developed. The [redacted] would access this box only in the off-line mode. The black box would contain a separate microprocessor running the RACE program. [redacted] software would treat the external software as a function that would return the encrypted or decrypted character with th[redacted] handling all text editing functions. Possible difficulties with this approach include TEMPEST--this involves design and subsequent testing and debugging of a new TEMPEST unit. After the initial development, a single board microcomputer implementing this algorithm and using [redacted] for I/O capability would be more cost-effective than buying stand-alone RACE units for each field station.

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25X1
25X1
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25X1

C. Another option would be use of the RACE hardware unit as a peripheral unit to [redacted] with the RACE handling the key management (key variable I/O, storage) and sending messages to [redacted] like any other peripheral unit. This approach would require the least modification to either equipments, but would cost the most, since RACE units would have to be purchased (at a cost of $8.5K per unit in quantity) for each field station, equipment that would be used infrequently.

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To accomodate these requirements, the development plan will be broken into two phases. Phase 1 of the project will address the analysis of the RACE unit hardware and software documentation to determine the parameters needed for the system design. This analysis will take place as a parallel effort with the [redacted] software analysis currently underway in OC-ED/CSB. The final product of Phase 1 of this project will be a proposal for the best possible system based on this study. The task breakdown for this phase of the project will be:

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1. Obtain RACE units and software documentation from NSA. A memorandum will be submitted formally requesting this information through official channels.

2. Perform software and hardware analysis on RACE using the Microprocessor Development Lab. This analysis will determine the operational and technical parameters needed for the design of an integrated system with [redacted] for example, the memory size requirements.

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3. Identify RACE system parameters and requirements for implementation in the [redacted]

25X1

4. Compare RACE requirements [redacted] capabilities. (obtained from current evaluation). This comparison will be based on the latest software information [redacted]

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5. Formulate possible system design approaches, summarize analysis and best design approach in final project proposal.

At the end of Phase 1, a decision will be reached on which option to use, (A, B, or C, above) to implement the off-line system. When this decision is made and approved by management, then the project will proceed with Phase 2.

9. DEVELOPMENT SCHEDULE - The following schedule is a tentative schedule for the completion of Phase 1.

Phase 1	Week Ending:
Obtain RACE prototype	6 Nov 81 *
25X1 Interface and test RACE, [redacted]	21 Nov 81 *
Send Memo to NSA requesting RACE documentation	30 Dec 81 *
Obtain documentation of RACE algorithm	15 Jan 82 *
Analyze RACE algorithm	15 Jan - 19 Feb 82
RACE algorithm parameters identified	12 Feb 82
Formulate design approach	1 Feb - 26 Mar 82
Select and order prototyping materials	12 Feb 82
25X1 Coordinate design with [redacted] DND project team	12 Mar 82
Design review meetings	19 Feb 82
	12 Mar 82
	26 Mar 82
Write Phase 2 project plan	12 Mar 82
Phase 2 Project Plan review/approval	26 Mar 82

* - Completed as of 19 January 1982

PRELIMINARY PROJECT PLAN

PROJECT NAME: OFFLINE CRYPTOSYSTEM REPLACEMENT PROJECT
PHASE 1 - REQUIREMENTS ANALYSIS

APPROVED:

C/ED_____

C/ED/CSB_____

CONCUR:

OC-CSD_____

OC-FND_____

OC-DND_____

1. SCOPE AND SUMMARY - The Office of Communications is presently evaluating the [redacted] communications terminal as a possible replacement for the aging M-28 terminal equipment currently in use throughout the network. This subproject will incorporate an off-line cryptosystem into the [redacted] terminal system, thereby eliminating the need for the HW-28 equipment now in use as primary and backup off-line crypto. This paper will examine the operational, technical, and security requirements and discuss several possible approaches to the problem. 25X1 25X1

2. PURPOSE - The original project that addressed off-line systems was Project [redacted] analyzed all currently available off-line systems and selected the RACE (Rapid Automatic Cryptographic Equipment) as the system that best fit the needs of a primary off-line communications center. The RACE system was later adopted by OC as a standard replacement for the HW-28 off-line terminals in primary off-line stations. 25X1

The purpose of this project is to incorporate the RACE off-line system into the M-28 replacement terminal to be used as either a primary or back-up cryptosystem. All operational functions being met by the HW-28 will be met by this system. In addition, any possible enhancements and automation will be developed and incorporated into the overall system. The project has been broken into two phases: first, a requirements analysis phase in which [redacted] RACE, and base station system capabilities and requirements will be identified. This information analysis phase will develope an optimum design approach to the system which will be summarized in the Phase 2 project plan. The second phase of the project will be the actual design and testing of a prototype system. 25X1

3. REASON - The current off-line cryptosystem is the HW-28, a slow, labor-intensive unit that is no longer supportable in the long term. It will be replaced by the microprocessor-based RACE system, the cryptographic portion of which has already been certified as high-grade cryptology by NSA. The RACE has been approved by OC as a replacement system for use in primary off-line stations. Incorporation of the RACE cryptographic subsystem into the new terminal equipment at stations that are primarily on-line will provide compatibility with the primary off-line stations, thereby simplifying the base station automation requirements [redacted]. In addition, if the RACE crypto algorithm can be coded as part of [redacted] software, then fewer 'stand-alone' RACE units will need to be purchased, resulting in considerable cost savings. A stand alone RACE unit will cost $8.5K to $10K in production quantities. This includes the keyboard, 16 character display, paper tape 25X1 25X1

reader (chad tape), and the associated support software (text editing, I/O handling) all of which are present in the

25X1 [redacted]

An objective of this project is to investigate whether a single board processor could be designed to use the [redacted] 25X1
existing I/O capability at a cost of less than $2K (in production quantities), resulting in a cost savings of 80%.

4. PROGRAM OVERVIEW - This project will be conducted as a major subproject of the M-23 Terminal Replacement Project. The project will be coordinated with [redacted] personnel 25X1
since both projects are under development concurrently and deal with offline cryptographic operations.

5. OPERATIONAL REQUIREMENTS

A. The final system must be TEMPEST (NACSEM 5100) approved and high grade cryptology, (approved for processing all classification levels through Top Secret Codeword).

B. The system shall be easy to operate, possibly by a non-OC communicator, since it may be used infrequently at stations where it is purely a back-up system.

C. The system shall interconnect with and/or form an integral part of the [redacted] system, permitting editing 25X1
and storage of messages.

D. Keying and key management should be as simple as possible.

E. Clearing garbles (i. e. due to loss of crypto-synchronization) should be either automatic or possible by bit- or character-slipping.

6. SECURITY REQUIREMENTS - The system shall be TEMPEST approved and capable of handling all levels of classifications. Ideally, the system should be capable of operation (i.e. meet TEMPEST standards) in or out of a shielded enclosure and require no storage controls (other than those normally required for [redacted] when in a 25X1
power-off state. Key storage will be in volatile RAM. Because the RACE algorithm [redacted] has already been approved 25X1
by NSA, NO modification will be made to the existing cryptographic software as it is used in the RACE. The implementation of the input and output routines, as well as key management routines that are currently used in the RACE will be closely coordinated with OC-CSL and NSA.

7. RESOURCE REQUIREMENTS - Precise requirements are difficult to estimate at this stage of the planning cycle, but the following is intended to give an approximation of the level of effort and funding that will be required.

Approx. 60 man-days engineering analysis and review of RACE hardware and software documentation to determine operational and technical parameters such as:

1. Memory size requirements
2. Implementation of [redacted] (the RACE algorithm) 25X1
3. I/O interfacing
4. Operation of automatic key selection
5. Power requirements

Approx. 10 man-days OC-CSD engineering to assist in analysis of RACE operation, technical requirements, and liaison with NSA.

Approx. 5 man-days engineering to summarize analysis results and prepare final project proposal document.

Approx. 4 man-days management supervision, review, budget preparations and revisions.

Approx. 3 man-days each OC-END, CSD, DND, and HRD review of project proposal.

COSTS:

2 ea. RACE units for evaluation.....$25 K.

Prototype development (parts, etc)..$ 8 K.

8. DEVELOPMENT PLAN - In the initial planning stages of this project, several questions will require answers prior to formulation of an approach to the system design. The characteristics and limitations of the [redacted] terminal will 25X1
have to be identified, along with an analysis of the RACE software. This requires the documentation of the RACE software which is to be delivered this week from NSA. The 25X1
[redacted] software is presently being analyzed by OC-ED/CSB.

The RACE parameters such as memory size, general organization and utilization of the [redacted] encryption 25X1
algorithm will impact the possible integration of the 25X1
algorithm into the [redacted] unit.

After these questions are answered, then one of several

options may be elected:

A. If the RACE algorithm will run on the Z-80 in the available memory space of the [redacted] it should be possible to extend the unused memory slots in the [redacted] to include the RACE algorithm. This would involve adding additional memory to [redacted]

B. If, because of security, memory, or power constraints, the RACE algorithm will not fit into the [redacted] then an external "black box" may be developed. The [redacted] would access this box only in the off-line mode. The black box would contain a separate microprocessor running the RACE program. The [redacted] software would treat the external software as a function that would return the encrypted or decrypted character with the [redacted] handling all text editing functions. Possible difficulties with this approach include TEMPEST--this involves design and subsequent testing and debugging of a new TEMPEST unit. After the initial development, a single board microcomputer implementing this algorithm and using the [redacted] for I/O capability would be more cost-effective than buying stand-alone RACE units for each field station.

C. Another option would be use of the RACE hardware unit as a peripheral unit to the [redacted] with the RACE handling the key management (key variable I/O, storage) and sending messages to the [redacted] like any other peripheral unit. This approach would require the least modification to either equipments, but would cost the most, since RACE units would have to be purchased (at a cost of $8.5K per unit in quantity) for each field station, equipment that would be used infrequently.

To accomodate these requirements, the development plan will be broken into two phases. Phase 1 of the project will address the analysis of the RACE unit hardware and software documentation to determine the parameters needed for the system design. This analysis will take place as a parallel effort with the [redacted] software analysis currently underway in OC-3D/CSB. The final product of Phase 1 of this project will be a proposal for the best possible system based on this study. The task breakdown for this phase of the project will be:

1. Obtain RACE units and software documentation from NSA.

2. Perform software and hardware analysis on RACE using the Microprocessor Development Lab. This analysis will determine the operational and technical parameters needed for the design of an integrated system with the [redacted] for example, the memory size requirements.

3. Identify RACE system parameters and requirements for implementation in [redacted] system. 25X1

4. Compare RACE requirements with [redacted] capabilities. 25X1
(obtained from current evaluation). This comparison will be based on the latest software information from 25X1
[redacted]

5. Formulate possible system design approaches, summarize analysis and best design approach in final project proposal.

At the end of Phase 1, a decision will be reached on which option to use, (A, B, or C, above) to implement the off-line system. When this decision is made and approved by management, then the project will proceed with Phase 2.

9. DEVELOPMENT SCHEDULE - The following schedule is a tentative schedule for the completion of Phase 1.

Phase 1	Week Ending:
Obtain documentation of RACE algorithm.....	6 Nov 81
Analyze RACE algorithm.....9 Nov 81 -	15 Jan 82
RACE algorithm parameters identified.....	15 Jan 82
Formulate design approach.....14 Dec 81 -	15 Jan 82
25X1 Coordinate design with [redacted] ND project team.....	15 Jan 82
Design review meetings	18 Dec 81
	8 Jan 82
	15 Jan 82
Write Phase 2 project plan.....w/o	18 Jan 82
Phase 2 Project Plan review/approval.....	29 Jan 82

OFF-IINE CRYPTCSYSTEM REPLACEMENT PROJECT

Preliminary Project Plan

[redacted]

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1. SCOPE AND SUMMARY - The Office of Communications is presently evaluating the [redacted] communications terminal as a possible replacement for the aging M-28 terminal equipment currently in use throughout the network. This subproject will incorporate an off-line cryptosystem into the replacement terminal system, thereby eliminating the need for the HW-28 equipment now in use as primary and backup off-line crypto. This paper will examine the operational, technical, and security requirements and discuss several possible approaches to the problem. 25X1

2. PURPOSE - The original project that addressed off-line systems was Project [redacted] analyzed all currently available off-line systems and selected the RACE (Rapid Automatic Cryptographic Equipment) as the system that best fit the needs of a primary off-line communications center. The RACE system was later adopted by OC as a standard replacement for the HW-28 off-line terminals in primary off-line stations. 25X1 25X1 [redacted]

The purpose of this project is to incorporate the RACE off-line system into the M-28 replacement terminal to be used as either a primary or back-up cryptosystem. All operational functions being met by the HW-28 will be met by this system. In addition, any possible enhancements and automation will be developed and incorporated into the overall system.

3. REASON - The current off-line cryptosystem is the HW-28, a slow, labor-intensive unit that is no longer supportable in the long term. It will be replaced by the microprocessor-based RACE system which has already been certified as high-grade cryptology by NSA. The RACE has been approved by OC as a replacement system for use in primary off-line stations. Incorporation of the RACE into the new terminal equipment at stations that are primarily on-line will provide compatibility with the primary off-line stations, thereby simplifying the base station automation requirements [redacted] In addition, if the RACE algorithm can be coded as part of the [redacted] software, then fewer 'stand-alone' RACE units will need to be purchased, resulting in considerable cost savings. 25X1 25X1

4. PROGRAM OVERVIEW - This project will be conducted as a major subproject of the M-28 Terminal Replacement Project. The project will be coordinated with [redacted] personnel since both projects deal with the implementation of RACE in an external system. 25X1

5. OPERATIONAL REQUIREMENTS

A. The final system must be TEMPEST approved and high grade cryptology, (approved for processing all classification levels through Top Secret Codeword).

B. The system shall be easy to operate, possibly by a non-OC communicator, since it may be used infrequently by stations where it is purely a back-up system.

C. The system shall interconnect with and/or form an integral part of the [redacted] system, permitting editing and storage of messages. 25X1

D. Keying and key management should be as simple as possible.

E. Clearing garbles (i. e. due to loss of crypto-synchronization) should be either automatic or possible by bit- or character-slipping.

6. SECURITY REQUIREMENTS - The system shall be TEMPEST approved and capable of handling all levels of classifications. Ideally, the system should be capable of operation [redacted] and require no storage controls (other than those normally required for the [redacted] when in a power-off state. Key storage will be in volatile RAM. Because the RAM algorithm [redacted] has already been approved by NSA, NO modification will be made to the existing software as it is presently used in the RACE. The implementation of the input and output routines, as well as key management routines that are currently used in the RACE will be closely coordinated with OC-CSD and NSA. 25X1 25X1 25X1

7. RESOURCE REQUIREMENTS - Precise requirements are difficult to estimate at this stage of the planning cycle, but the following is intended to give an approximation of the level of effort and funding that will be required.

Apprx. 60 man-days engineering analysis and review of RACE hardware and software documentation to determine operational and technical parameters such as:

1. Memory size required
2. Implementation [redacted] (the RACE algorithm) 25X1
3. I/O interfacing
4. Operation of automatic key selection
5. Power requirements

Apprx. 10 man-days OC-CSD engineering to assist in analysis of RACE operation, technical requirements, and liason with NSA.

Apprx. 5 man-days engineering to summarize analysis results and prepare final project proposal document.

Apprx. 4 man-days management supervision, review, budget preparations and revisions.

Apprx. 3 man-days each OC-FND, CSD, DND, and HRD review of project proposal.

COSTS:

2 ea. RACE units for evaluation...$25 K.

Prototype development (parts, etc)..$ 8 K.

8. DEVELOPMENT PLAN - In the initial planning stages of this project, several questions will require answers prior to formulation of an approach to the system design. The characteristics and limitations of the [redacted] terminal will 25X1
have to be identified, along with an analysis of the RACE software. This requires the documentation of the RACE software which is to be delivered within the next few weeks
25X1 from NSA. The [redacted] software is presently being analyzed by OC-ED/CSB.

The RACE parameters such as memory size, general organization and utilization of the [redacted] encryption 25X1
algorithm will impact the possible integration of the
25X1 algorithm into the [redacted]

After these questions are answered, then one of several options may be elected:

A. If the RACE algorithm will run on the Z-80 in the available memory space of the [redacted] it should be 25X1
possible to extend the unused memory slots in the
25X1 [redacted] to include the RACE algorithm. This would involve adding additional memory to the [redacted] 25X1

B. If, because of security, memory, or power constraints, the RACE algorithm will not fit into the
25X1 [redacted] then an external "black box" may be developed.
25X1 The [redacted] would access this box only in the off-line mode. The black box would contain a separate microprocessor running the RACE program. The [redacted] 25X1
software would treat the external software as a function that would return the encrypted or decrypted character with the [redacted] handling all text editing 25X1
functions. Possible difficulties with this approach

include TEMPEST--this involves design and subsequent testing and debugging of a new TEMPEST unit. After the initial development, a single board microcomputer implementing this algorithm and using [redacted] for I/O capability would be more cost-effective than buying stand-alone RACE units for each field station. 25X1

C. Another option would be use of the RACE hardware unit as a peripheral unit to [redacted] with the RACE handling the key management (key variable I/O, storage) and sending messages to [redacted] like any other peripheral unit. This approach would require the least modification to either equipments, but would cost the most, since RACE units would have to be purchased (at a cost of $8.5K per unit in quantity) for each field station, equipment that would be used infrequently. 25X1 25X1

To accomodate these requirements, the development plan will be broken into two phases. Phase 1 of the project will address the analysis of the RACE unit hardware and software documentation to determine the parameters needed for the system design. This analysis will take place as a parallel effort with the [redacted] software analysis currently underway in OC-ED/CSB. The final product of Phase 1 of this project will be a proposal for the best possible system based on these studies. The task breakdown for this phase of the project will be: 25X1

A. Obtain RACE units and software documentation from NSA.

B. Perform software and hardware analysis on RACE using the Microprocessor Development Lab. This analysis will determine the operational and technical parameters needed for the design of an integrated system with the TRACOR; for example, the memory size requirements.

C. Identify RACE system parameters and requirements for implementation in the [redacted] 25X1

25X1 D. Compare with [redacted] capabilities. (obtained from current evaluation). This information will be based on the latest software information from [redacted] 25X1

E. Formulate possible system design approaches, summarize analysis and best design approach in final project proposal.

At this point, a decision will be reached on which option to use, (A, B, or C, above) to implement the off-line system. When this decision is made and approved by management, then the project will proceed with the design of the implementation (Phase 2).

Date

ROUTING AND TRANSMITTAL IP

TO: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1. AC/EAB/CES		11/17
2. C/EAB		11/24
3. C/PDB		11/24
4. C/TSB	WM	11/24
5. AC/CSD		11/24

	Action		File		Note and Return
	Approval		For Clearance		Per Conversation
	As Requested		For Correction		Prepare Reply
	Circulate		For Your Information		See Me
	Comment		Investigate		Signature
	Coordination		Justify		

REMARKS

6. Sam G.

It is my understanding that several questions concerning RACE's interface with [redacted] were raised at the 10 Nov. COMSEC staff meeting. Attached is the latest M-28 replacement "Prelimenary Project Plan". Hopefully, it will answer many of those questions. Should additional information be needed, I will be happy to arrange a detailed briefing. The attached copy supersedes the Project Plan dated 29 Oct.

STAT

Sam

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post)	Room No.—Bldg.
	Phone No.

5041-102

OPTIONAL FORM 41 (Rev. 7-76)
Prescribed by GSA
FPMR (41 CFR) 101-11.206

☆ U.S.GPO:1978-0-261-647/3354

ROUTING AND TRANSMITTAL SLIP Date

TO: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1. C/OC-CSD/EAB/CES		10/30
2. C/OC-CSD/EAB		11/3
3. C/PDB		11/4
4. C/TSB		11/5
5. AC/CSD		11/5

	Action		File		Note and Return
	Approval		For Clearance		Per Conversation
	As Requested		For Correction		Prepare Reply
	Circulate		For Your Information		See Me
	Comment		Investigate		Signature
	Coordination		Justify		

REMARKS

6. Sam Greenfield

Attachment is FYI

STAT COMSEC representatives are [redacted] and [redacted] STAT also represented us on the RACE committee.

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post)	Room No.—Bldg.
	Phone No.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1979 281-104

OPTIONAL FORM 41 (Rev. 7-76)
Prescribed by GSA
FPMR (41 CFR) 101-11.206

11/5/81

OS noise readings

fan - 64 DB

fan + PTR 82.1 DB

78.1

53.5

85.2

STAT

printer
keyboard
magnetic tape storage
visual display